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Structural Engineering
Roads & Car Parks
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Technical Audits & Assessments

THE OLD LIBRARY
LOWER MORDEN LANE
MORDEN

FLOOD RISK ASSESSMENT

Issue Issue C

Date 26th June 2015

Client Ref

Job No 5581B2

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EXECUTIVE SUMMARY

This report supports the application for the proposed development of a new building containing 6 flats, each floor supporting 2 flats each, being the ground flood, first floor and second floor. The report has been written in compliance with the National Planning Policy Framework document and accompanying Technical Guidance published in March 2012.

Predicted flood water levels from the Beverley Brook have been obtained from the Environment Agency and these indicate the highest flood water level at the site for the 1 in 100 year event plus climate change is 21.23m ODN. The existing ground floor of the building is 21.34m ODN.

The ground levels around the building range from 21.1m ODN to 21.22m ODN, whilst the levels on the footpath in Lower Morden Lane are approximately 21.2m ODN. The maximum depth of water is therefore no more than 120mm (approximately 5 inches) which does not constitute a risk to any person for access purposes.

The Strategic Flood Risk Assessment has also been reviewed to identify other flood risks and this site does not fall within areas identified as being at greater risk of surface water flooding. However, an historic surface water flooding incident in Lower Morden Road is recorded, which primarily affected the adjacent school, but did also result in very shallow flooding within the Old Library.

The surface water flooding is, in our opinion, the highest flood risk to the site.

A number of mitigation measures are proposed and these include: raising the finished floor level for the flats to a level of 21.54 m ODN (200mm above the existing floor level); raising electrical sockets and meters, and the installation of a flood protection barrier at the ground floor doors. These barriers would prevent flood water entering the building in extreme circumstances. We would also advise residents to connect to the flood warning system so that they would be aware of any flood warnings and can take the appropriate flood protection actions.

We would also recommend that part of the existing impermeable area is altered to a permeable surface to reduce the overall surface water discharge, and that water butts should be attached to the downpipes to be used for watering. These water butts will also act as initial attenuation storage in any rainfall event.

A number of existing outbuildings are to be removed which will further reduce the surface water discharge.

The application to convert part of the ground floor of the Old Library to residential use can provide safe accommodation to the occupants, and the predicted flood levels also show that safe access to and from the building is possible even for the most extreme event.

A previous planning application for converting part of the ground floor to a flat has been approved (Planning Application no 12/P/3032) but this application supersedes this application.

1.0 INTRODUCTION

Monson has been asked to produce a Flood Risk Assessment (FRA) to support an application for prior approval for a change of use of the ground floor from offices to three flats with a further flat on the first floor at the Old Library, Lower Morden Lane, Morden SM4 4SJ. A previous application (12/P/3032) to convert part of the ground floor to a flat has been approved but this application supersedes the approved application..

This report will conform to the National Planning Policy Framework and Technical Guidance published in March 2012.

The site is located just off Lower Morden Lane as indicated on the location plan included in Appendix A. The land is situated in Flood zone 3a, the flood map from the Environment Agency showing the flood zones is included in Appendix B.

2.0 DEVELOPMENT DESCRIPTION AND LOCATION

2.1 Development type and location

The application for the proposed development of a new building containing 6 flats, each floor supporting 2 flats each, being the ground flood, first floor and second floor. There is no increase in the floor area but as this application will result in additional dwellings it cannot be considered as minor development. Similarly, there is no definition or inclusion of “Change of Use” in the Technical Guidance, whereas this was previously stipulated in PPS25. Therefore the Sequential Test would still be applicable in this case.

2.2 Development classification

The development is considered to be more vulnerable as described in Table 2 of the Technical Guidance. Whilst it is recognised that new development should be directed to areas of lower flood risk, it is also recognised in Table 1 within the Technical Guidance that “More Vulnerable” development is appropriate in flood zone 3a if it meets certain criteria: “The More Vulnerable uses in Table 2 should only be permitted in this zone if the Exception Test is passed.”

2.3 Planning Legislation and Local Development Framework

Recent Relevant Planning Legislation

Statutory Instruments 2013 No1101 Relating to Town and Country Planning England came in to force on 31st May. This allowed the permitted development of the change of use from offices to residential use.

Permitted Development

“Development consisting of a change of use of a building and any land within its curtilage to a use falling within Class C3 (dwelling houses) of the Schedule to the Use Classes Order from a use falling within Class B1(a) (offices) of that Schedule.”

This proposal comes within this permitted development as the ground floor has been used as offices.

The applicant is required to contact the Local Planning Authority to ascertain whether prior approval is required in respect of: Transport and Highway impacts, Contamination risks on the site, and flooding risks on the site.

This report will cover the flooding risks.

Local Development Framework

The following is taken from the Strategic Flood Risk Assessment Report relating to planning policies for the London Borough of Merton.

London Borough of Merton

Merton Unitary Development Plan (2003)

Merton’s Unitary Development Plan was adopted in October 2003 and aims to give a clear statement of the council’s policies and proposals for development and land use. Relevant flood risk policies from the current UDP include:

Policy PE.5: Risk from flooding
In ‘low’ to ‘medium’ and ‘high risk’ flood zone areas (flood zones 2 and 3) as identified by the Environment Agency, an application for development should be accompanied by a Flood Risk Assessment appropriate to the scale and nature of the development proposed.

New development in flood zone 3(B) will not be permitted unless the particular location is essential and it can be demonstrated that an alternative lower risk location is not available. Residential development on such land will be limited to job related accommodation.

In flood zone 3(C) built development will be limited to transport and utilities infrastructure that needs to be located in the area. Recreation, sport and conservation uses will be permitted, provided that adequate warning and evacuation procedures can be provided.

In flood zones 1, 2 and 3(A) New development or the intensification of existing development will not be permitted where it would:
(i) Increase the risk of flooding within this area or downstream;
(ii) Materially impede the flow of floodwater;
(iii) Reduce the capacity of the floodplain to store water;
(iv) Adversely affect flood defence structures or other features with the same role or obstruct land needed for access and/ or maintenance purposes to such structures.

Policy PE.6: Water Quality
Developments that would lead to pollution of groundwater or surface water by reason of their wastewater discharge or surface water will not be permitted. Developments will not be permitted unless foul sewers and sewage treatment works of adequate capacity of design can be provided in time to serve the development. When assessing applications for developments the council will have regard to the following factors:
(i) The incorporation of measures that reduce pollution at source;
(ii) The incorporation of best management techniques for the control of the quality of surface water run-off;
(iii) The nature and scale of development proposed.

Policy PE.7: Capacity of Water Systems
The council will seek to reduce water run-off arising from development and will encourage the provision of sustainable drainage systems.

Developments which would have an unacceptable impact on the capacity of water systems by either over-use of available water supplies or by leading to an increase in flood risk in the area or elsewhere will not normally be permitted. Developments will not normally be permitted unless adequate water supply and sewerage disposal are made available at the time of development.

Merton Local Development Framework

Public consultation on Merton's Preferred Policy Options took place in July 2007, where details of the Core Strategy, Development Control Policies and Proposals Map were available. Submission of Development Control Documents to the Planning Inspector was scheduled for April 2008 with targeted policy adoption by 2009. Relevant flood risk policies from Merton's LDF are detailed below:

Policy DC P 5: Development and flooding and surface water run-off
Applications for development outside areas at risk from flooding will be required to take into consideration their impact on surface water run-off and where they are above 1 hectare in size be required to produce a Flood Risk Assessment. The Flood Risk Assessment will be required to demonstrate that the rate of surface water run-off is the same as or less than before the new development occurred, stating the attenuation measures to be used.

Development in areas at risk from flooding will be required to set out a Flood Risk Assessment advising how the flood risk will be mitigated. Only the types of development set out by the sequential test in PPS 25 will be permitted in these areas. The Strategic Flood Risk Assessment for the borough should be considered.

Policy DC P 6: Water quality and supply
Development that would lead to pollution of groundwater or surface water by reason of their wastewater discharge or surface water will not be permitted.

Development that will impact the water supply for existing users and reduce the capacity of existing drainage, wastewater and sewerage will not be permitted unless adequate infrastructure can be installed.

In respect of the Unitary Development Plan, the proposed development does not increase the risk of flooding within this area or downstream, materially impede the flow of floodwater, reduce the capacity of the floodplain to store water, adversely affect flood defence structures or other features with the same role or obstruct land needed for access and/ or maintenance purposes to such structures.

The policies for the Local Development Framework can also be met with this application as this flood risk assessment will show how the flood risk will be mitigated and the development will have no impact on water quality, nor will the development have any significant impact on the existing drainage and water supply capacity, as the office use will be comparable to the residential use.

2.4 Sequential Test

The Sequential Test should be applied by the Local Authority as they are aware if alternative sites in lower flood risk areas are available for development at this time.

However, the information provided by the Environment Agency indicates the flood risk from the Beverley Brook is not as significant as indicated from the flood map and the site is only marginally at risk even when climate change is taken in to account. The building itself is not at risk of fluvial flooding under climate change conditions.

The area is not deemed to be within an area at risk from Surface Water Flooding as indicated on the plans within the Strategic Flood Risk Assessment, although an incident of surface water flooding has been recorded at Lower Morden Lane which affected the adjacent school.

The recent planning legislation has been passed in order to facilitate the conversion of offices to residential accommodation due to the current lack of new residential properties, and this site meets that criteria as long as it can be shown the accommodation will be safe from flooding.

2.5 Exception Test

The Exception Test as defined in the National Planning Policy Framework now covers two requirements:

- it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a Strategic Flood Risk Assessment where one has been prepared; and
- a site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

The sustainability benefits will be covered within the supporting planning statement but this site specific flood risk assessment will show how the accommodation will be safe for the lifetime of the building and will not increase flood risk elsewhere. This is explained in detail in section 8.

3.0 DEFINITION OF THE FLOOD HAZARD

3.1 Flood sources

Flooding from the Sea

There is no risk of tidal flooding from the River Thames as the ground levels are in excess of 20m ODN.

Flooding from Rivers

The site is approximately 50m south of the Beverley Brook and this is a principle source of flood risk to the site. The Environment Agency has completed a computer model for this watercourse and the data is included in Appendix C. This shows there may be very shallow flooding by the property in the 1 in 100 year flood event plus climate change, when taken in to account. There is almost no flooding around the property for the 1 in 100 year event itself. The maximum flood level, for the 1 in 100 year plus climate change event, is 21.23m ODN, which is approximately 110mm below the finished floor level of the building. This is based on the flood plain levels provided by the Environment Agency.

Flooding from Land

Flooding from land is associated with run-off from steep hills/escarpments gathering at a low point. This is a residential area and run-off from land is not an issue at this location. However, this location has suffered from surface water flooding in the past and this is associated with run-off from impermeable areas exceeding the capacity of the sewerage network. This will be considered as flooding from sewers below.

Flooding from Groundwater

Flooding from groundwater is again normally associated with springs emerging from hills, which either directly affect properties or the water gathers at a low point to cause flooding. The SFRA has been checked and there is no indication of a risk from groundwater at this location.

Flooding from Sewers.

The surface water sewers are generally not designed to cater for the 1 in 100 year rainfall event, and therefore some surface water flooding would be expected in extreme rainfall events. The historical surface water flooding records in the SFRA has been checked and the general area is not deemed to be at risk from surface water flooding due to topography, geology and historic flood records. However, there has been an incident of surface water flooding close to the site in July 2007, which has been recorded at the adjacent school. We have checked with the owner of the Old Library and he has confirmed the building suffered very slight internal flooding (approximately 50mm) on this occasion.

Flooding from Reservoirs, Canals and other artificial sources.

There are no such sources of flood risk that could affect this application.

The most significant flood risk at this location is from the surface water flooding from surface water flooding rather than that from the Beverley Brook.

3.2 Surface water drainage

The existing surface water arrangements for the building and hard standing will be retained but some of the outbuildings will be removed, which will reduce the overall surface water discharge from the site.

4.0 PROBABILITY

4.1 SFRA and other relevant data

The Environment Agency has undertaken a modelling exercise on the Beverly Brook which has established flood water levels both in the channel and in the floodplain. The full information from the Environment Agency is included in Appendix C.

The site is almost exactly at the Floodplain 2 location as indicated on the flood map, and the estimated flood levels for the various return period storms are shown in the table below.

	Flood levels (m ODN)			
	1 in 20	1 in 50	1 in 100	1 in 100 +CC
Floodplain 1	N/A	N/A	N/A	21.56
Floodplain 2	**N/A**	**21.00**	**21.19**	**21.23**
Floodplain 3	N/A	21.13	21.23	21.29

The site survey included in Appendix E shows the ground floor level is 21.34m ODN and the ground level around the building towards Lower Morden Lane ranges from 21.12 to 21.23. It can be seen that the building itself will not be at risk of flooding and the surrounding land would have a maximum water depth of 110mm. This very shallow depth of water poses no risk to people according to table 13.1 from report FD2320 shown below.

Table 13.1 Danger to people for different combinations of depth and velocity

Velocity (m/s)	Depth of flooding (m)											
	0.05	0.10	0.20	0.30	0.40	0.50	0.60	0.80	1.00	1.50	2.00	2.50
0.00												
0.10												
0.25												
0.50												
1.00												
1.50												
2.00												
2.50												
3.00												
3.50												
4.00												
4.50												
5.00												

Key:
- Danger for some
- Danger for most
- Danger for all

R&D OUTPUTS: FRA GUIDANCE FOR NEW DEVELOPMENT: PHASE 2 FD2320/TR2

The outputs from the Environment Agency model would indicate the building is safe from flooding for the 1 in 100 year event, and although shallow water may surround the site, this would not prevent safe access to and from the building.

The Strategic Flood Risk Assessment (SFRA) produced by Wandsworth, Merton, Croydon and Sutton Boroughs has also been studied to determine other sources of flooding other than the fluvial risk from the Beverley Brook.

The relevant maps are produced in Appendix D and show the historic flood records for both surface water flooding and groundwater flooding. As stated in section 3.1, there is no evidence of flood risk from groundwater but there has been an incident of surface water flooding at the adjacent school in July 2007. There are no records of depth of water for this incident, but the owner of the Old Library has confirmed the building was slightly affected by this rainfall event, with water reaching about 50mm within the building. This would give a flood water level of approximately 21.4m ODN.

The SFRA does provide a flow chart for the Sequential Test which should be applied to any proposed new development in flood zone 3a.

The SFRA does not identify this area as being at risk from surface water flooding but does record a surface water flooding incident at Lower Morden Lane which occurred in 2007.

A previous application for residential development at this location was refused at appeal in 2004. The basis of the refusal was flood risk, based on the Environment Agency flood level information on the Beverley Brook at the time. The ground level was taken as 21.1m ODN, which is slightly lower than the survey suggests, but in 2004 this was considered to be at risk of flooding from the 1 in 5 year event. It is evident from the more

recent modelling in 2009 that the site is not affected by the 1 in 5 year event, and in fact the 1 in 50 year event only gives a floodplain level of 21.0m ODN. The Inspector could only make his decision on the basis of advised flood levels at the time, but it is clear from the current data that, whilst dry access away from the property may not be achieved, there is no measurable risk to people due to the very shallow depths of flooding now predicted.

A more recent application (12/P/3032) for the change of use of part of the ground floor to a residential flat was approved by the Local Planning Authority.

5.0 CLIMATE CHANGE

The Environment Agency model to determine flood levels from the Beverley Brook does take climate change in to account.

6.0 PREVIOUS FLOODING HISTORY

The historical flood records as included in the SFRA show the surface water incident close to the site and also the outline of the 1968 event, which is the worst recorded flooding from this watercourse.

This outline runs close to the site so, it is possible that shallow flooding around or close to the property occurred during this event. This is not surprising as this event is deemed to be close to the 1 in 100 return period storm, which would produce flooding to a level approximately equal to 21.19m ODN.

7.0 FLOOD RISK MANAGEMENT MEASURES

The proposal should be considered in respect of the flood risk management hierarchy which is: assess – avoid – substitute – control – mitigate.

Assess:
This FRA is an appropriate flood risk assessment for a development at this location.

Avoid:
It may be possible to provide residential accommodation in lower risk areas of the Borough and it will be the responsibility of the Local Authority to assess whether the benefits of development at this location outweigh the very limited flood risk that has been identified.

Substitute:
The application is to change the use of part of the existing building and therefore it is not possible to locate the development in an area of lower flood risk.

Control:
The existing surface water arrangements for the site will be maintained but some outbuildings will be removed, which will reduce the overall surface water discharge. Any new hard standing areas should be constructed using a permeable surface, and it also may be possible to replace some of the existing impermeable hard standing with a permeable surface to further reduce surface water discharges.

Mitigate:
Mitigation measures are included in section 8.

8.0 PROPOSED MITIGATION MEASURES

The development proposals are included in Appendix F.

The main mitigation measure is to slightly raise the finished floor level for the flats on the ground floor, so that the ground floor levels are above the level reached when the building was affected by shallow surface water flooding. The finished floor level would be raised by 200mm to a level of 21.54m ODN.

This will also mean the floor level is over 300mm above the predicted 1 in 100 year plus climate change fluvial flood level.

The ground floor flat should also be made more flood resilient by ensuring the electrical sockets are at least 300mm above the floor level, and all meters should be similarly sited at least 300mm above the floor level. If possible, it would be preferable to have drop downs from a main circuit on the first floor rather than have the main circuit ring on the ground floor.

In addition to the flood resilience measures, it would also be possible to install flood resistance measures to further safeguard the property. These could incorporate a barrier at the ground floor doors which would prevent flood water entering the building in extreme circumstances. There are a number of proprietary makes which are on the market which provide quick and easy protection to buildings. Such products include a stop board system supplied by Flood Ark, or a complete door protection system such as Floodguard produced by “Floodsense” or Floodgate provided by Floodgate Ltd. All these products have Kite Marks.

Such systems can be installed very quickly and would provide additional protection to the whole building.

We would recommend that residents connect to the flood warning system so that they would be aware of any flood warnings and can take the appropriate flood protection actions.

We would also suggest that surface water run-off from the overall site could be reduced if some of the impermeable parking areas were changed to a permeable surface. Water butts could also be used on the existing downpipes for watering purposes and would act as an attenuation facility when empty or only partially full.

There are no other mitigation measures proposed due to the limitations of converting an existing building.

The mitigation measures proposed will ensure the dwelling is safe from flooding for the lifetime of the property and the reduction in impermeable area will reduce the overall flood risk in the area. Both these measures will satisfy the second criteria of the Exception Test.

9.0 ACCESS

The predicted 1 in 100 year flood level and the 1 in 100 year flood level with climate change for the Beverley Brook are 21.19m ODN and 21.23m ODN respectively. The topographical survey in Appendix E shows the ground between the building and Lower Morden Lane ranges from 21.12 to 21.22m ODN, therefore there is a maximum depth of water equal to 110mm.

The levels along the footpath on Lower Morden Lane are approximately 21.2m ODN and about 125mm lower in the road. Therefore along the footpath the maximum depth of water is only 10mm and about 135mm in the road.

Whilst this is not a dry access, it is evident from the table provided in section 4.1 that these depths of water do not constitute a danger to people as they are so shallow, and the velocity of water at the edge of the floodplain will be minimal, and certainly less than 0.5m/s.

Therefore, whilst the access may not be dry in the most extreme flood event, it would certainly be classified as safe and would not constitute a risk to the residents or the emergency services if access to or from the building was required at the peak of the flood.

The surface water flooding experienced in 2007 actually resulted in deeper water levels than those predicted for the Beverley Brook as water did enter the building itself. The maximum depth of water would be at most 280mm at the edges of the building but slightly less from the front access to the road, which at most would be approximately 200mm.

There would not be a velocity associated with this type of surface water flooding so again, whilst the access would not be dry in such an event, there is no danger to people for depths up to 300mm.

10.0 CONCLUSION

The proposed development is the construction of a new building containing 6 flats, each floor supporting 2 flats each, being the ground flood, first floor and second floor.

Predicted flood water levels from the Beverley Brook have been obtained from the Environment Agency and these indicate the highest flood water level at the site for the 1 in 100 year event plus climate change is 21.23m ODN. The existing ground floor of the building is 21.34m ODN.

The ground levels around the building range from 21.1m ODN to 21.22m ODN, whilst the levels on the footpath in Lower Morden Lane are approximately 21.2m ODN. The maximum depth of water is therefore no more than 120mm (approximately 5 inches) which does not constitute a risk to any person for access purposes.

The Strategic Flood Risk Assessment has also been reviewed to identify other flood risks and whilst this site does not fall within areas identified as being at greater risk of surface water flooding, an historic surface water flooding incident in Lower Morden Road

is recorded which primarily affected the adjacent school but did also result in very shallow flooding within the Old Library.

The surface water flooding is, in our opinion, the highest flood risk to the site.

A number of mitigation measures are proposed and these include: raising the finished floor level within the ground floor flats to a level of 21.54 m ODN (200mm above the existing floor level); raising electrical sockets and meters, and the installation of a flood protection barrier at the ground floor doors. These barriers would prevent flood water entering the building in extreme circumstances. We would also advise residents to connect to the flood warning system so that they would be aware of any flood warnings and can take the appropriate flood protection actions.

We would also recommend that part of the impermeable area is altered to a permeable surface to reduce the overall surface water discharge, and that water butts should be attached to the downpipes to be used for watering. These water butts will also act as initial attenuation storage in any rainfall event.

A number of existing outbuildings are to be removed which will further reduce the surface water discharge.

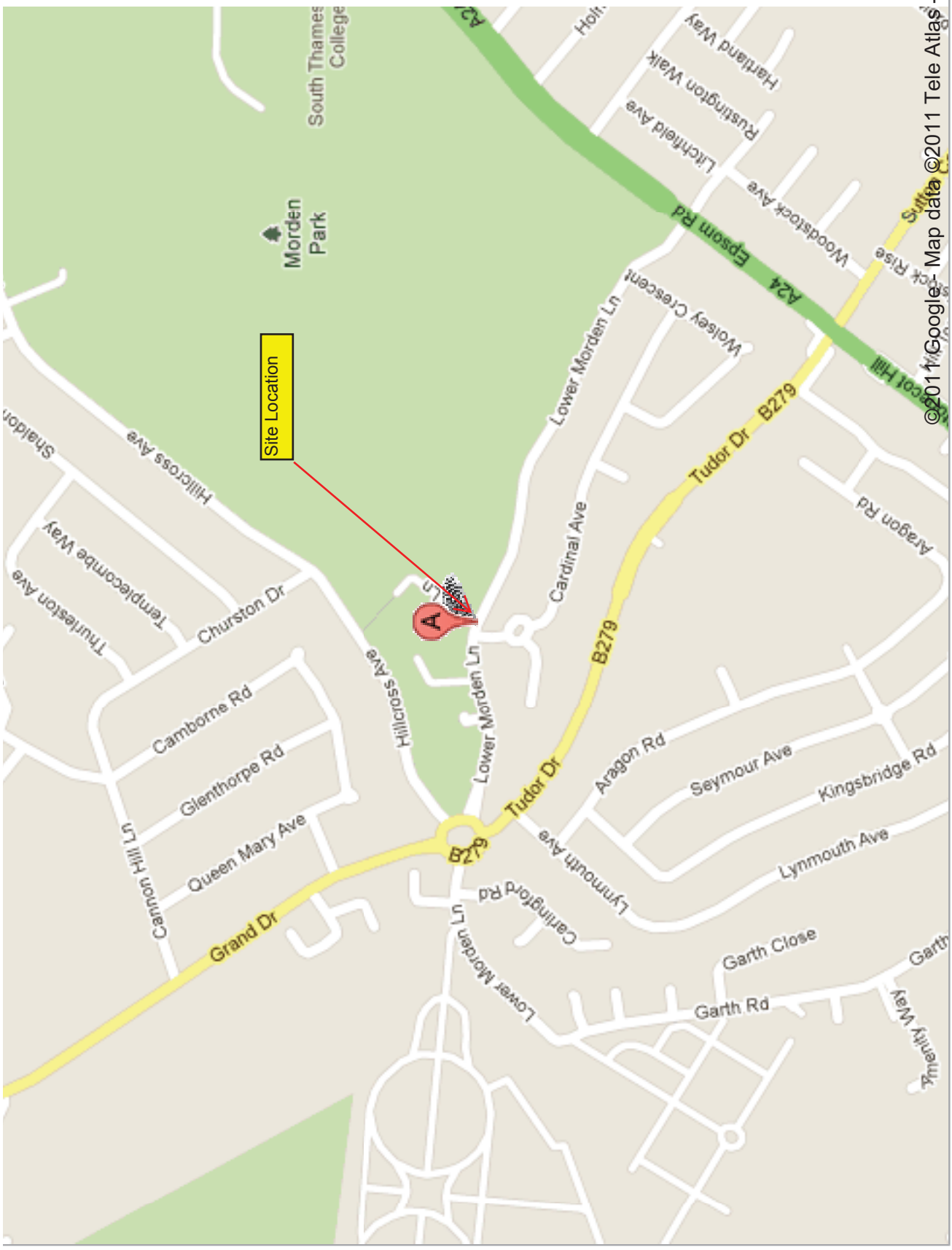
The application to convert the ground floor of the Old Library to residential use can provide safe accommodation to the occupants, and the predicted flood levels also show that safe access to and from the building is possible even for the most extreme event.

11.0 RECOMMENDATION

It is recommended that the Planning Authority approve the findings of this Flood Risk Assessment and agree that there is no reason to object to the change of use of the ground floor from office to residential use on the basis of flood risk.

APPENDIX A

SITE LOCATION PLAN


Site Location
Morden Park
South Thames College
Epsom Rd
A24
Lichfield Ave
Rustington Walk
Hartland Way
Woodstock Ave
Wolsey Crescent
Lower Morden Ln
Cardinal Ave
Tudor Dr
B279
Aragon Rd
Seymour Ave
Kingsbridge Rd
Lynmouth Ave
Garth Close
Garth Rd
Carlingford Rd
Lower Morden Ln
Hillcross Ave
Churston Dr
Templecombe Way
Thurleston Ave
Camborne Rd
Glenthorpe Rd
Queen Mary Ave
Cannon Hill Ln
Grand Dr
©2011 Google - Map data ©2011 Tele Atlas -

APPENDIX B

ENVIRONMENT AGENCY – FLOOD MAP

Flooding

Enter postcode or place name:

SM4 4SJ

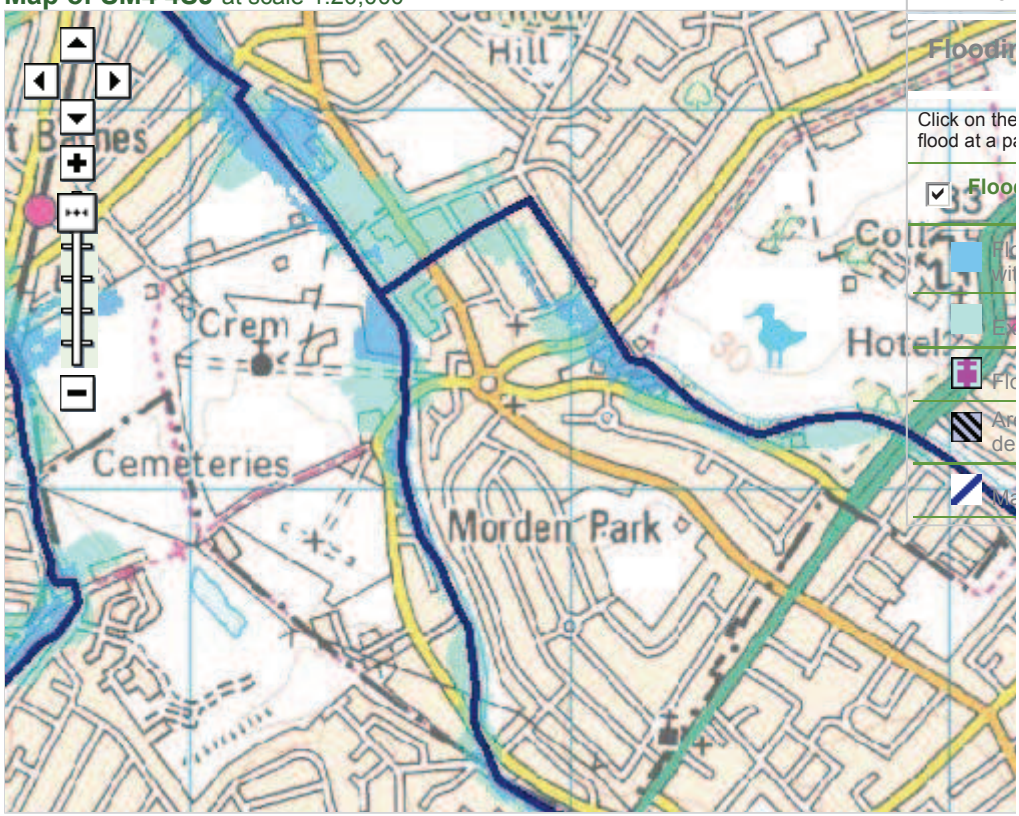
Search

Overview map:

Other topics for this area...

- Risk of Flooding - NEW Main River Line added
- Flood Warning
- Rivers
- Bathing Water Quality
- Groundwater - NEW Aquifer Maps
- Waste
- Pollution
- Air Pollution
- Environment Agency Offices
- River Basin Management Plans - Rivers
- River Basin Management Plans - Lakes
- River Basin Management Plans - Coastal Waters

Map of SM4 4SJ at scale 1:20,000



view text version of all results

An issue has been identified in Risingbrook, Stafford:

This will be resolved during the next update in July 2010.
For further information regarding this area please contact us directly.

More about flooding:

Understanding the flood map
A more detailed explanation to help you understand the flood map shown above.

Current flood warnings
We provide flood warnings online 24 hours a day. Find out the current flood warning status in your local area.

Flood map - your questions answered
Answers to commonly asked questions about the flood map.

APPENDIX C

FLOOD LEVEL DATA FOR BEVERLEY BROOK FROM

THE ENVIRONMENT AGENCY

Use of Environment Agency Information for Flood Risk Assessments / Flood Consequence Assessments

Important

If you have requested this information to help inform a development proposal, then you should note the following:

In **England**, you should refer to the Environment Agency's Flood Risk Standing Advice and PPS25 and its associated Practice Guide for information about what flood risk assessment is needed for new development in the different flood zones. These documents can be accessed via:
http://www.environment-agency.gov.uk/research/planning/82587.aspx
http://www.communities.gov.uk/publications/planningandbuilding/pps25floodrisk
http://www.communities.gov.uk/publications/planningandbuilding/pps25practiceguide

You should also consult the Strategic Flood Risk Assessment produced by your local planning authority.

In **Wales**, you should refer to TAN15 for information about what flood consequence assessment is needed for new development in the different flood zones
http://new.wales.gov.uk/topics/planning/policy/tans/tan15?lang=en

You should also refer to any Strategic Flood Consequence Assessment produced by your local planning authority.

In **both England and Wales** you should note that:

1. Information supplied by the Environment Agency may be used to assist in producing a flood risk or flood consequence assessment (FRA/FCA) where one is required, but does not constitute such an assessment on its own.

2. This information covers flood risk from main rivers and the sea, and you will need to consider other potential sources of flooding, such as groundwater or overland runoff. The information produced by the local planning authority referred to above may assist here.

3. Where a planning application requires a FRA/FCA and this is not submitted or deficient, the Environment Agency may well raise an objection.

4. For more significant proposals in higher flood risk areas, we would be pleased to discuss details with you ahead of making any planning application, and you should also discuss the matter with the local planning authority.

Product 4 (Detailed Flood Risk) for Lower Morden Lane, Morden
Our ref: SE 19058

Product 4 is designed for developers where Flood Risk Standing Advice FRA (Flood Risk Assessment) Guidance Note 3 Applies.

i) "all applications in Flood Zone 3, other than non-domestic extensions less than 250 sq meters; and all domestic extensions",
ii) "all applications with a site area greater than 1 ha" in Flood Zone 2.

Product 4 includes the following information:

Ordnance Survey 1:25k colour raster base mapping;
Flood Zone 2 and Flood Zone 3;
Relevant model node locations and unique identifiers (for cross referencing to the water levels, depths and flows table);
Model extents showing *defended* scenarios;
FRA site boundary (where a suitable GIS layer is supplied);
Flood defence locations (where available/relevant) and unique identifiers; (supplied seperately)
Flood Map areas benefiting from defences (where available/relevant);
Flood Map flood storage areas (where available/relevant);
Historic flood events outlines (where available/relevant, not the Historic Flood Map) and unique identifiers;
Statutory (Sealed) Main River (where available within map extents);

A table showing:

i) model node X/Y coordinate locations, unique identifiers, and levels and flows for *defended* scenarios.
ii) Flood defence locations unique identifiers and attributes; (supplied
iii) Historic flood events outlines unique identifiers and attributes; and
iv) local flood history data (where available/relevant).

Please note:

If you will be carrying out computer modelling as part of your Flood Risk Assessment, please read the enclosed guidance which sets out our requirements and best practice for computer river modelling.

This information is based on that currently available as of the date of this letter. You may feel it is appropriate to contact our office at regular intervals, to check whether any amendments/ improvements have been made. Should you re-contact us after a period of time, please quote the above reference in order to help us deal with your query.

This information is provided subject to the enclosed notice which you should read.

This letter is not a Flood Risk Assessment. The information supplied can be used to form part of your Flood Risk Assessment. Further advice and guidance

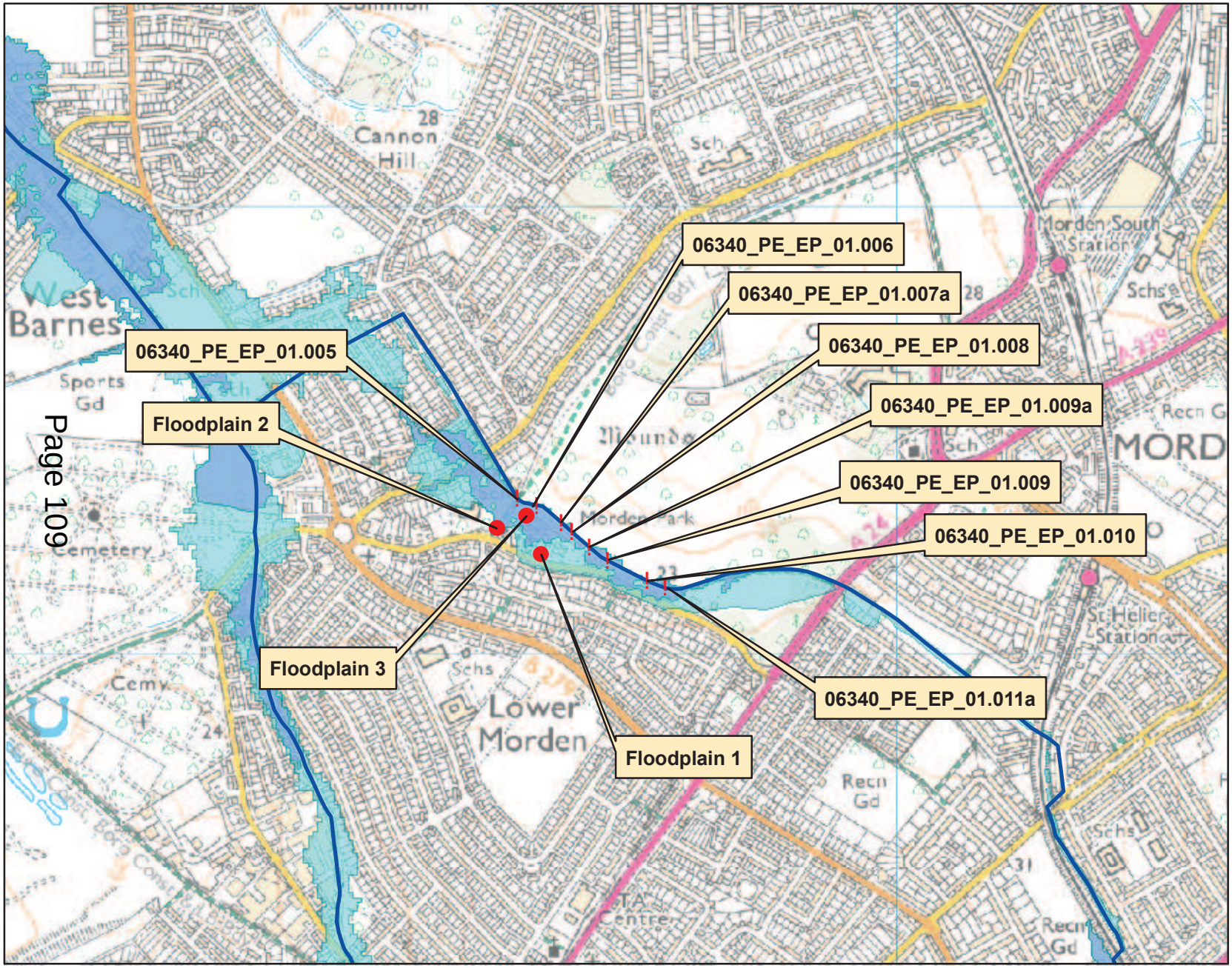
http://www.environment-agency.gov.uk/research/planning/82584.aspx

If you would like advice from us regarding your development proposals you can complete our pre application enquiry form which can be found at

http://www.environment-agency.gov.uk/research/planning/33580.aspx

Swift House, Frimley Business Park, Camberley, Surrey, GU16 7SQ
Customer services line: 08708 506 506
Email: enquiries@environment-agency.gov.uk

Detailed FRA Map centred on Lower Morden Lane, Morden - created 29th April 2010, REF SE19058



Environment Agency

Scale 1:10,000

Legend

- Nodes
- Main River
- Flood Zone 3: 1% AEP
- Flood Zone 2: 0.1% AEP

AEP = Annual Exceedance Probability
The probability of a flood of a particular magnitude, or greater, occuring in any given year

1%CC = 1% Climate Change extent
This is the 1% AEP event with an allowance for climate change (+20% on river flows)

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 08708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Modelled in-channel flood flows and levels

SE 19058

The modelled flood levels and flows for the closest most appropriate model node points for your site that are within the river channel are provided below:

				flood levels (mAOD)			
Node label	Model	Easting	Northing	20% AEP	5% AEP	1% AEP	1% AEP with climate change allowance (+20% on river flows)
06340_PE_EP_01.011a	Beverley Brook re-modelling 2009	524485	167147	22.05	22.21	22.33	22.43
06340_PE_EP_01.010	Beverley Brook re-modelling 2009	524444	167162	21.89	22.06	22.09	22.16
06340_PE_EP_01.009	Beverley Brook re-modelling 2009	524356	167207	21.58	21.80	22.01	22.10
06340_PE_EP_01.009a	Beverley Brook re-modelling 2009	524315	167237	21.41	21.62	21.75	21.79
06340_PE_EP_01.008	Beverley Brook re-modelling 2009	524275	167272	21.12	21.41	21.76	21.80
06340_PE_EP_01.007a	Beverley Brook re-modelling 2009	524252	167292	21.07	21.34	21.59	21.63
06340_PE_EP_01.006	Beverley Brook re-modelling 2009	524197	167330	20.86	21.24	21.52	21.56
06340_PE_EP_01.005	Beverley Brook re-modelling 2009	524153	167346	20.52	20.87	21.14	21.18

				flood flows (m3/s)			
Node label	Model	Easting	Northing	20% AEP	5% AEP	1% AEP	1% AEP with climate change allowance (+20% on river flows)
06340_PE_EP_01.011a	Beverley Brook re-modelling 2009	524485	167147	2.12	3.04	4.16	4.10
06340_PE_EP_01.010	Beverley Brook re-modelling 2009	524444	167162	2.49	3.63	5.26	6.03
06340_PE_EP_01.009	Beverley Brook re-modelling 2009	524356	167207	3.34	4.78	4.73	4.84
06340_PE_EP_01.009a	Beverley Brook re-modelling 2009	524315	167237	3.33	4.99	7.40	8.75
06340_PE_EP_01.008	Beverley Brook re-modelling 2009	524275	167272	3.32	4.96	5.74	5.80
06340_PE_EP_01.007a	Beverley Brook re-modelling 2009	524252	167292	3.32	4.95	6.66	7.18
06340_PE_EP_01.005	Beverley Brook re-modelling 2009	524153	167346	3.33	4.93	6.28	6.49

Modelled floodplain flood levels

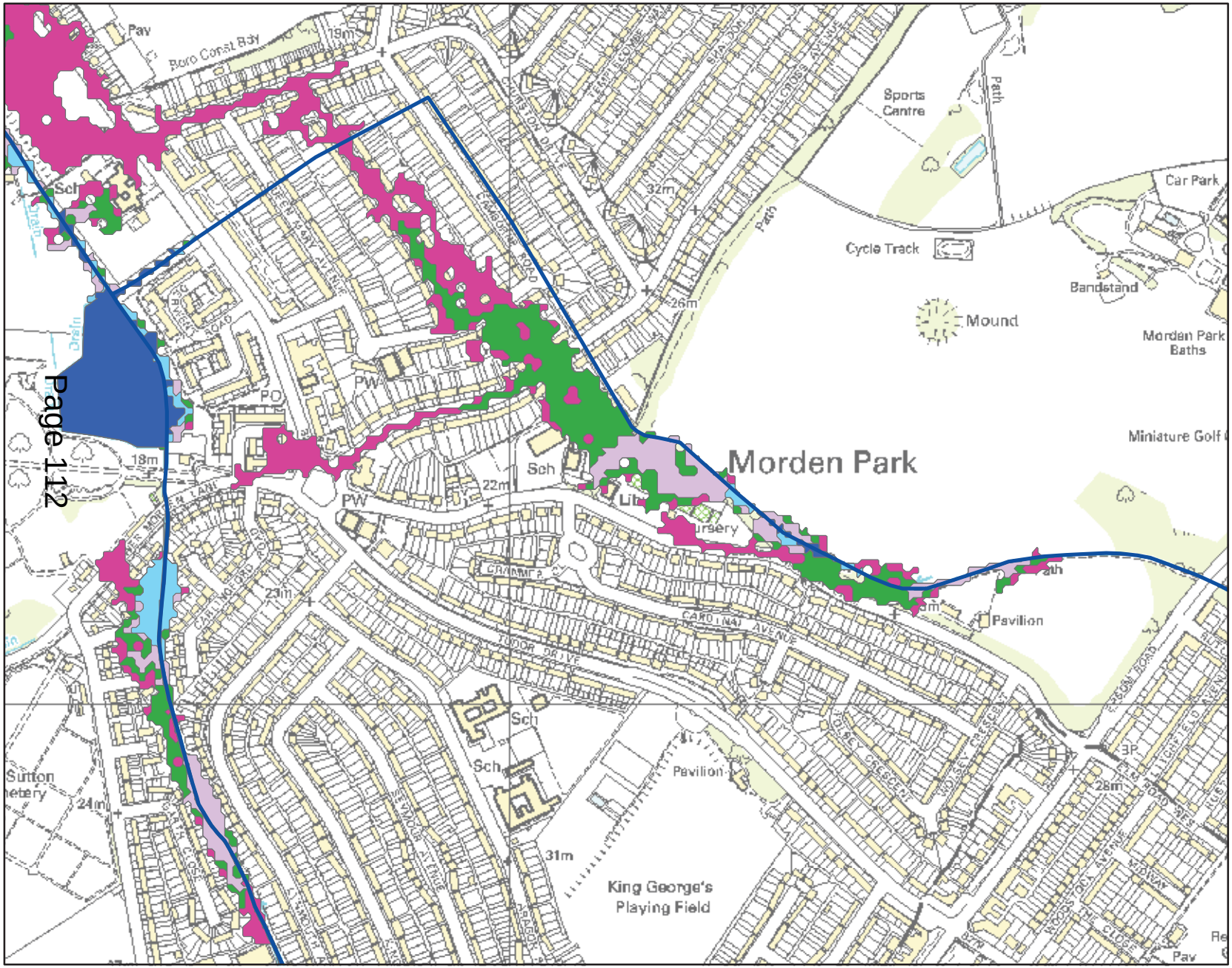
SE 19058

The modelled flood levels for the closest most appropriate model grid cells for your site are provided below:

			flood levels (mAOD)			
2D grid cell reference	Model	Grid Reference	5% AEP	2% AEP	1% AEP	1% AEP with climate change allowance (+20% on river flows)
Floodplain1	Beverley Brook	TQ2420767220	N/a	N/a	N/a	21.56
Floodplain2	Beverley Brook	TQ2410967279	N/a	21.00	21.19	21.23
Floodplain3	Beverley Brook	TQ2417467307	N/a	21.13	21.23	21.29

This flood model has represented the floodplain as a grid.
The flood water levels have been calculated for each grid cell.

Detailed FRA Map centred on Lower Morden Lane, Morden - created 29th April 2010, REF SE19058



Environment Agency

Scale 1:6,000

Legend

- Main River
- 20% detailed flood extent
- 5% detailed flood extent
- 2% detailed flood extent
- 1% detailed flood extent
- 1% cc detailed Flood Extent

AEP = Annual Exceedance Probability
The probability of a flood of a particular magnitude, or greater, occuring in any given year

1%CC = 1% Climate Change extent
This is the 1% AEP event with an allowance for climate change (+20% on river flows)

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 08708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Model information

SE 19058

Model: Beverley Brook

Dislaimer: The information provided is from the Beverley Brook Detailed Flood Risk Mapping Study completed in March 2009. A 1D-2D ISIS-TUFLOW model was developed to model the Beverley Brook, Pyl Brook, East Pyl Brook and the Coombe Brook.

Accuracy of the final model:
A limitation of the current Beverley Brook model is uncertainty relating to the degree of blockage of the Coombe Lane culvert. This has contributed to poor calibration at the New Malden and Wimbledon Common gauges. Stability issues at the confluence between the Beverley Brook and the Pyl Brook have also been observed. There was poor calibration at Motspur Park for the July 2007 event, which was attributed to blockage at Green Lane.

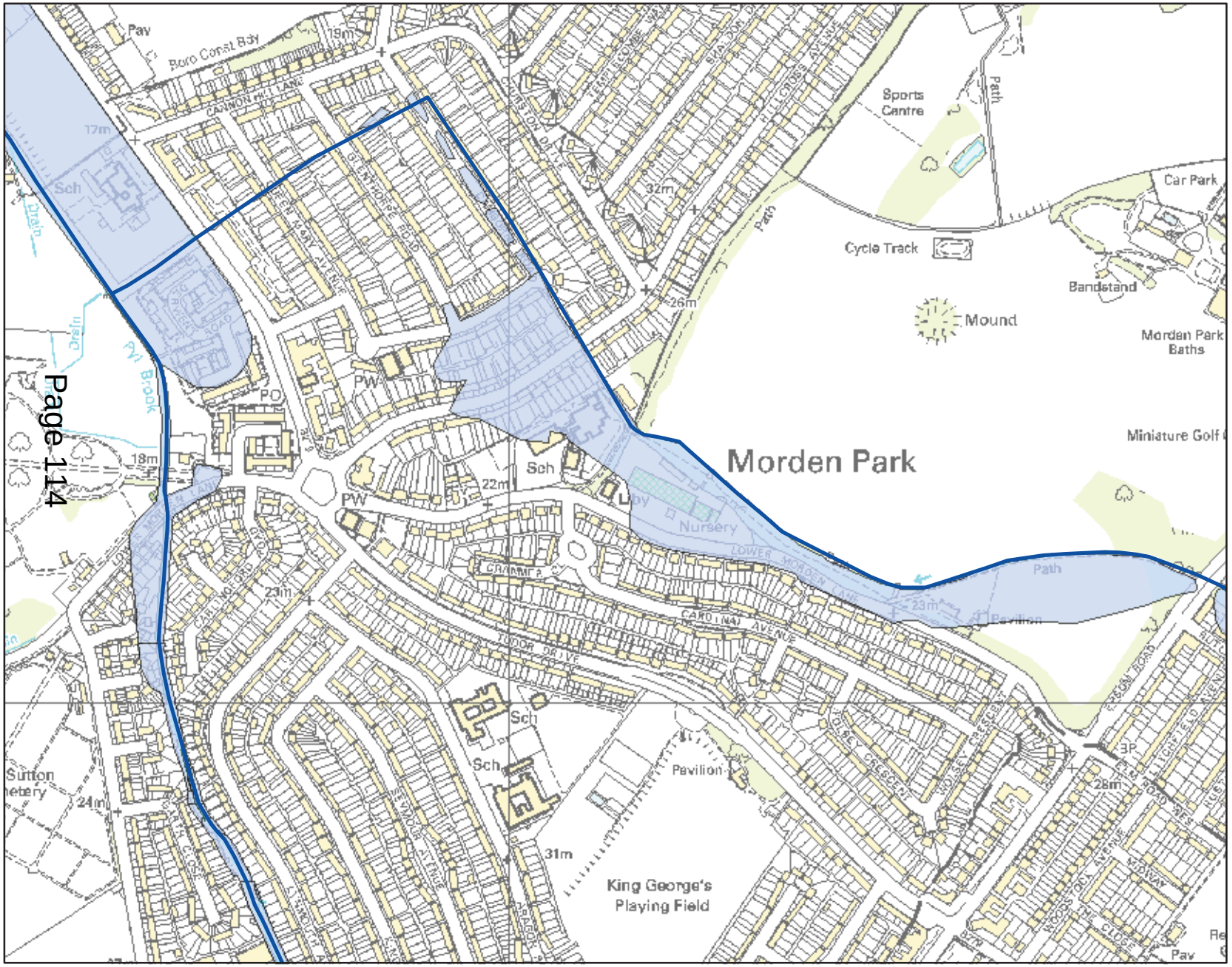
These limitations have resulted in the following accuracy ranges for the model:

Beverley Brook:
Catchment except Motspur Pk to Wimbledon Common gauges +/- 150mm
Section between Motspur Park and Wimbledon Common gauges +/- 300mm

Pyl Brook: +/- 150mm
East Pyl Brook: +/- 150mm

Model design runs:
1 in 5 / 20%; 1 in 20 / 5%; 1 in 50 / 2%; 1 in 100 / 1%; and 1 in 100+20% / climate change.

Detailed FRA Map centred on Lower Morden Lane, Morden - created 29th April 2010, REF SE19058



Environment Agency

Scale 1:6,000

Legend

- Main River
- Historic Extent 1968

AEP = Annual Exceedance Probability
The probability of a flood of a particular magnitude, or greater, occuring in any given year

1%CC = 1% Climate Change extent
This is the 1% AEP event with an allowance for climate change (+20% on river flows)

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 08708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Historic flood data

SE 19058

Our records show that the area of your site has been affected by flooding.
Information on the floods that have affected your site is provided in the table below:

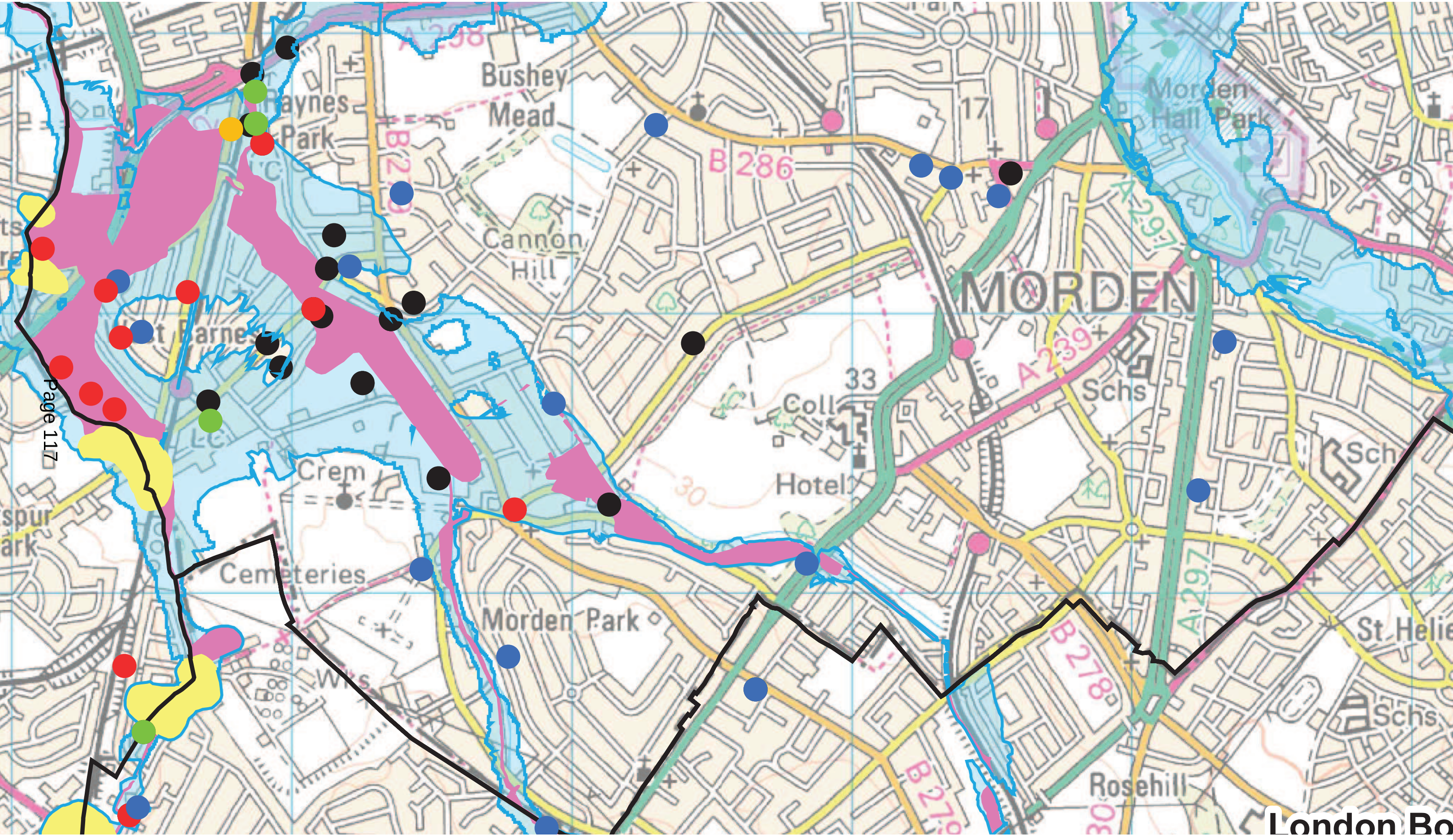
Flood Event Code	Flood Event Name	Start Date	End Date	Source of Flooding	Cause of Flooding
EA0619680900483a	06SeptemberAutumn1968	01/01/1968	12/12/1968	main river	channel capacity exceeded (no raised defences)

Extra historic flood information:

Please note the Environment Agency maps flooding to land not individual properties. Floodplain extents are an indication of the geographical extent of a historic flood. They do not provide information regarding levels of individual properties, nor do they imply that a property has flooded internally.

APPENDIX D

RELEVANT PLANS FROM THE SFRA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Cannon Hill
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Morden Hall Park
Morden Park
Cemeteries
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Hotel
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Rosehill
St Helie
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A239
B278
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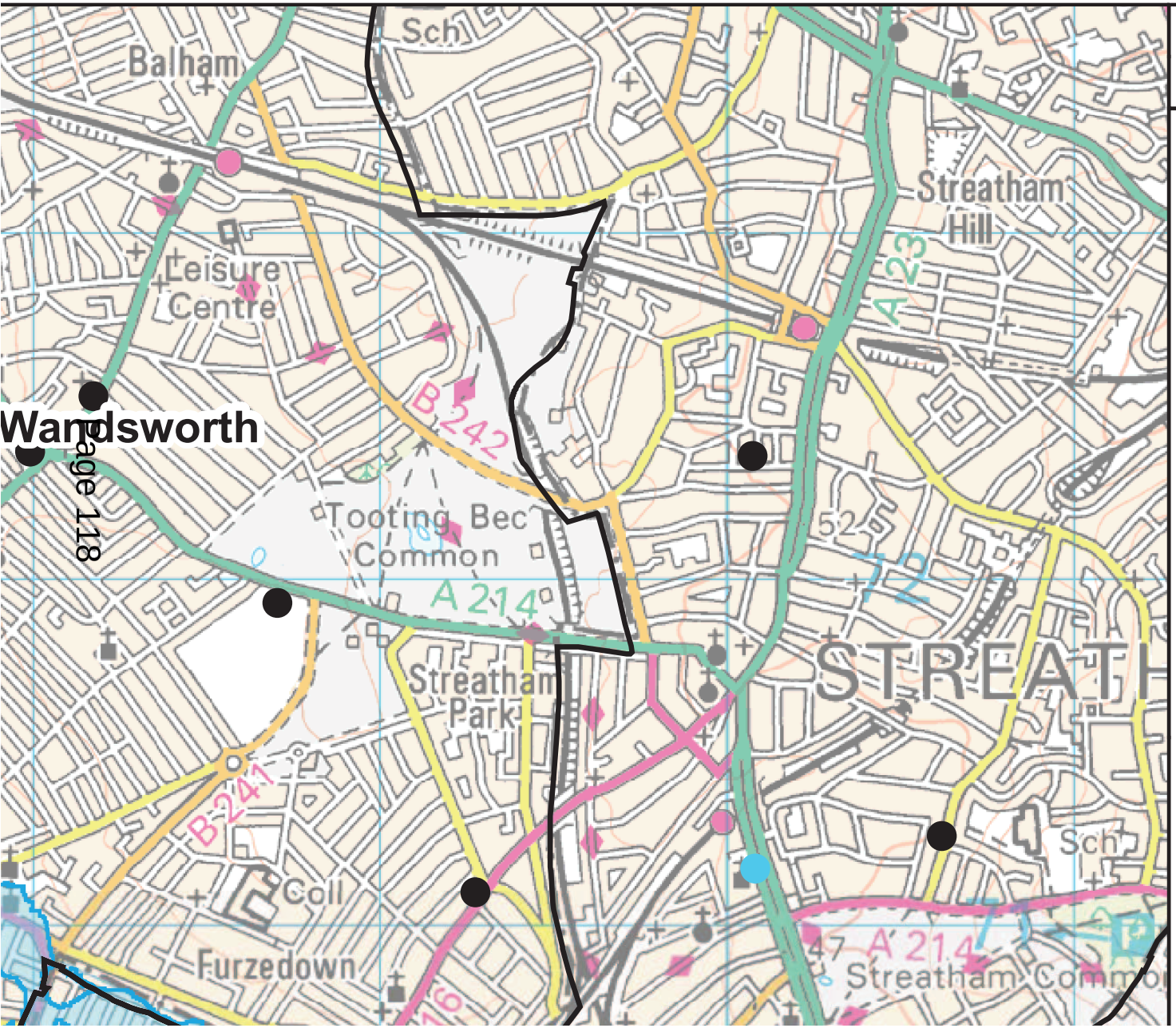
30



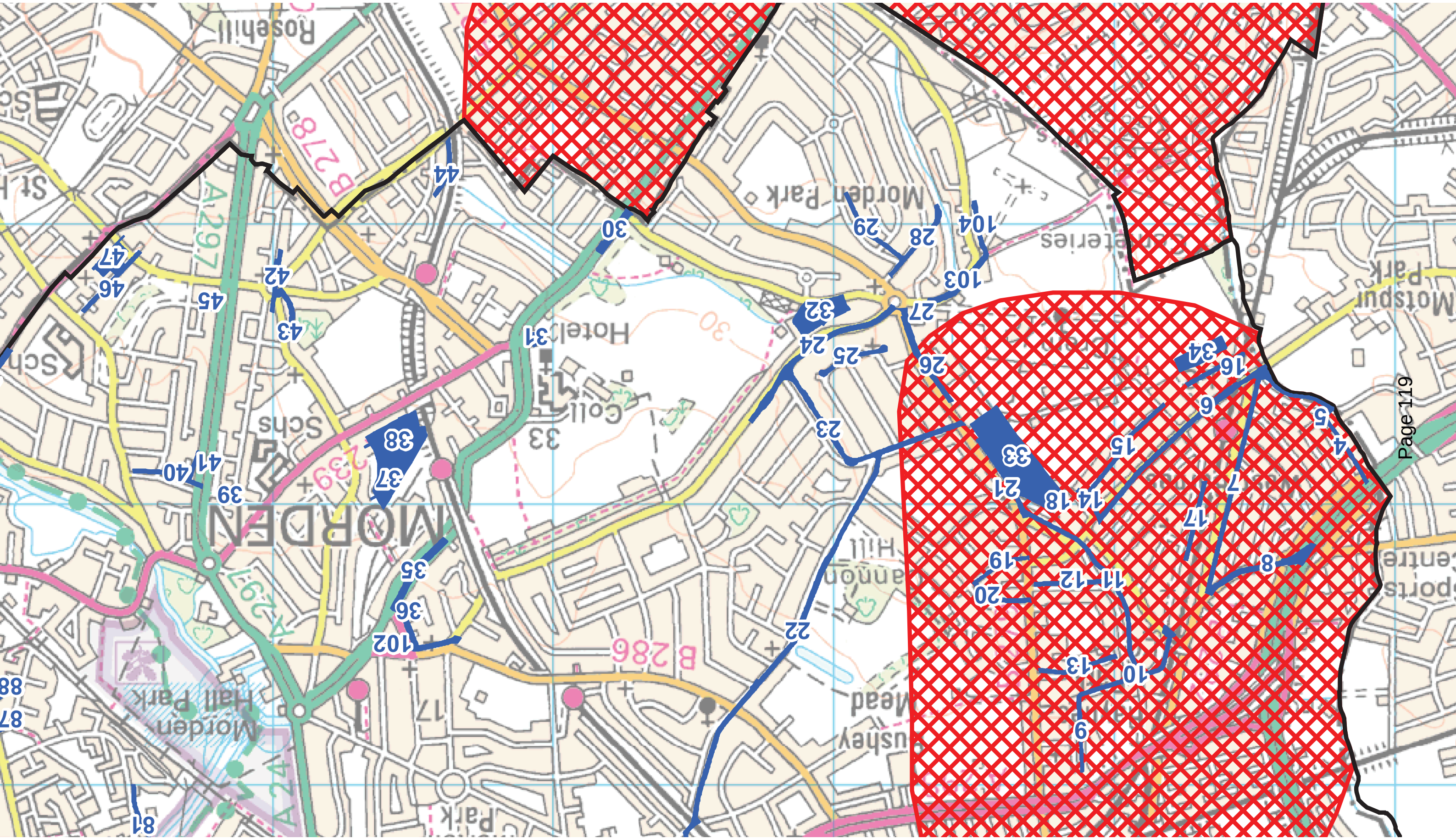
THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

NOTES

- London Borough Boundaries
- Environment Agency Flood Zone 2
- Environment Agency Historic Flood Extents - 1937
- Environment Agency Historic Flood Extents - 1968

Total Number of Affected Properties

- < 10
- 11 - 15
- 16 - 20
- 21 - 25
- > 25
- Unknown


MORDEN
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Hall Park
Rosehill
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B286
Hotel
Golf
Schs
Park
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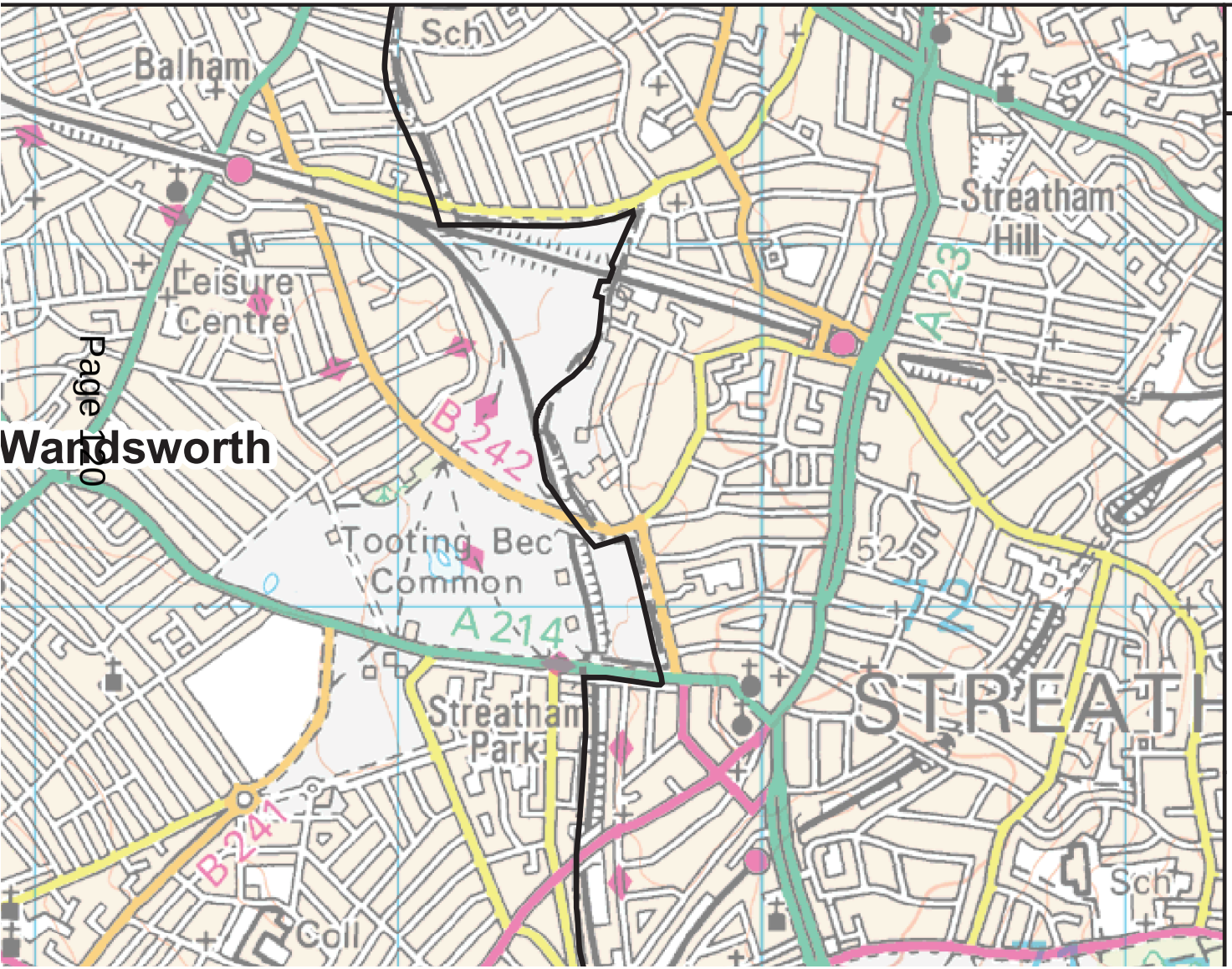


NOTES

London Borough Boundaries

Areas with increased risk of surface water ponding based on topography, geology and historic flooding records

Areas subjected to surface water flooding - July 2007

1 Reference Number (see Table G-2)

Figure 9B Ref No	Road Name	Site	Ward	Other	Approx Easting	Approx Northing
17	Seaforth Avenue	n/a	West Barnes	Junction with Adela Avenue to O/S 76 Seaforth Avenue	522710	168058
18	Meadowsweet Close	n/a	West Barnes		523200	167993
19	Meadow Close	n/a	West Barnes		523432	168232
20	Elm Walk	n/a	West Barnes		523476	168310
21	Grand Drive	n/a	West Barnes	O/S 226 to junction of Westway	523387	167905
22	Cannon Hill Lane	n/a	Cannon Hill		524191	168548
23	Churston Drive	n/a	Cannon Hill		524050	167691
24	Hillcross Avenue	n/a	Lower Morden	Beverley Roundabout to O/S 299 Hillcross Avenue	524151	167499
25	Cambourne Road	n/a	Lower Morden	Queen Mary Avenue to O/S 91 Cambourne Road	523969	167488
26	Grand Drive	n/a	Morden	Beverley Roundabout to O/S 264 Grand Drive	523701	167468
27	Buttermere Close	n/a	Lower Morden		523661	167316
28	Lynmouth Avenue	n/a	Lower Morden	Tudor Drive to O/S 389 Lynmouth Avenue	523691	167060
29	Aragon Road	n/a	Lower Morden	Lynmouth Avenue to O/S 245 Aragon Road	523895	167010
30	Epsom Road	n/a	Lower Morden	Rutland Drive to borough boundary.	524782	167026
31	n/a	Manor House, 230 London Road, Morden, Surrey, SM4 5QT	St. Helier		525062	167412
32	n/a	Hatfeild Primary School, Lower Morden Lane, Morden, Surrey, SM4 4SJ	Lower Morden		524043	167327
33	n/a	School, Wimbledon College Campion Centre Grand Drive, Raynes Park,	West Barnes		523351	167831

APPENDIX E

TOPOGRAPHICAL SURVEY

NOTES :

1. Survey is based on arbitrary grid.
2. All levels are related to a datum, BM 28.68 located on the house wall at 93 Epsom Road Value 28.68m.
3. All levels on kerb lines are channel levels unless noted otherwise.

ABBREVIATIONS : (where applicable)

ACU	Air Conditioning Unit	IRF	Iron Railing Fence
AL	Access Ladder	IRS	Illuminated Road Sign
AR	Assumed Route	KO	Kerb Outlet
AV	Air Valve	LB	Litter Bin
BB	Bellisha Beacon	LK	Low Kerb
BL	Basement Light	LP	Lamp Post
BO	Bollard	MB	Multibole tree
BP	Block Paving	MC	Mercury IC
BRW	Brick Retaining Wall	MH	Manhole
BS	Bus Stop	Mk	Marker Post
BSh	Bus Shelter	NB	Notice Board
BT	British Telecom I.C	NFI	No Further Information
BW	Brick Wall	NP	Street Name Plate
BWF	Barbed Wire Fence	OHW	Overhead Wire
CB	Control Box	OSBM	O. S. Bench Mark
CBF	Close Board Fence	P	Pillar
CCTV	Closed Circuit Television	PB	Post Box
CIF	Corrugated Iron Fence	PC	Pedestrian Crossing
CL	Cover Level	PF	Palisade Fence
CLF	Chain Link Fence	PK	Portakabin
CLSF	Chain Link Security Fence	Pl	Planter
Co	Column	PL	Plinth
Conc	Concrete	PM	Parking Meter
CPS	Concrete Paving Slabs	PO	Post
CPF	Chestnut Paling Fence	PSF	Palisade Security Fence
CP	Concrete Plinth	P&CF	Post & Chain Fence
CR	Cycle Rack	P&RF	Post & Rail Fence
CRW	Concrete Retaining Wall	P&WF	Post & Wire Fence
CS	Cobblestones	RE	Rodding Eye
CT	Cable T.V I.C	RH	Road Hump
CW	Concrete Wall	RS	Road Sign
DC	Duct Covers	RW	Retaining Wall
DCh	Drainage Channel	SEP	Service Entry Point
DK	Drop Kerb	SL	Soffit Level
DP	Down Pipe	SP	Stand Pipe
EIC	Electricity I.C	SVP	Soil Vent Pipe
EP	Electricity Pole	SW	Stone Wall
ER	Earthing Rod	SWMH	Surface Water Manhole
FB	Flower Bed	TCB	Telephone Call Box
FH	Fire Hydrant	TK	Top of Kerb level
FL	Flood Light	TL	Traffic Light
FP	Fuel Pump	TM	Ticket Machine
FWMH	Foul Water Manhole	TP	Telegraph Pole
GA	Gate	TW	Top of Wall
GB	Grit Box	UTL	Unable To Lift
GC	Grasscrete	VP	Vent Pipe
GP	Gate Post	WB	Wheel Barrier
GR	Guard Rail	WL	Water Level
GU	Gully	WM	Water Meter
GV	Gas Valve	WO	Washout
IB	Illuminated Bollard	WP	Waste Pipe
IC	Inspection Cover	WV	Water Valve
IL	Invert Level	VSP	Vehicle Sensor Pad

STATION	EASTING	NORTHING	LEVEL	TYPE
ST01	500.000	500.000	50.000	PEG
ST02	536.151	536.156	48.779	NAIL
ST03	519.838	611.263	48.291	NAIL
ST04	529.406	645.960	48.898	NAIL
ST05	487.679	632.567	48.827	NAIL

N

Rev.	Description	Date
A	LEVELS ADJUSTED TO BM 93 EPSOM RD	19/02/03

Glanville
Catherine House, Boundary Way
Hemel Hempstead, Herts HP2 7RP
Tel: (01442) 202600
Fax: (01442) 212599
Postbox@glanvillegroup.com
www.glanvillegroup.com

Client :
MR. C. DUGGIN

Project :
THE LIBRARY
150 LOWER MORDEN LANE

Title :
LEVEL SURVEY

Project Engineer : HG
Project Director : HG
Scale : 1:200
Date : 13/2/2003
Status :

Drawing No. GS220655/100
Rev A

APPENDIX F

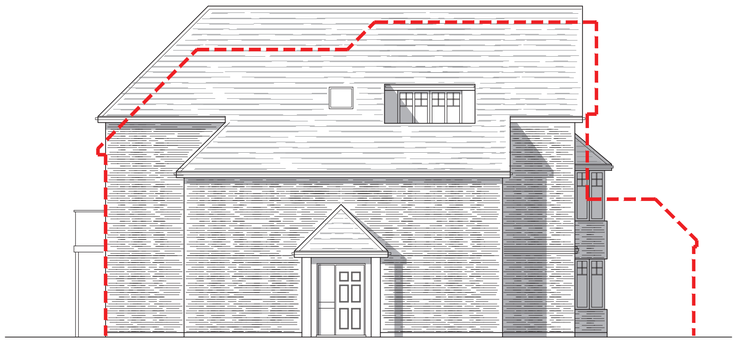
DEVELOPMENT PROPOSALS

0cm 2cm 4cm 6cm 8cm 10cm

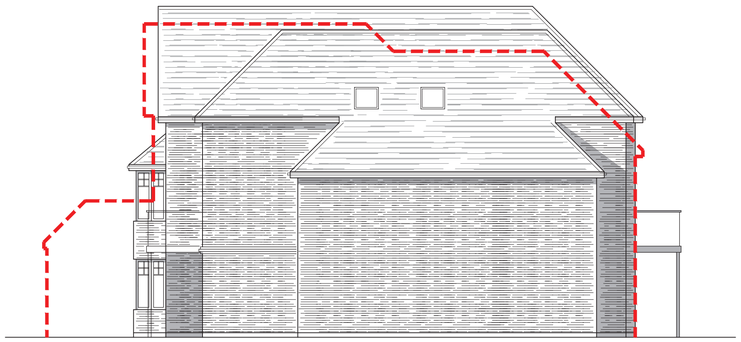
scale verification bar
This drawing prints at A1.

PROPOSED FRONT ELEVATION 1:100

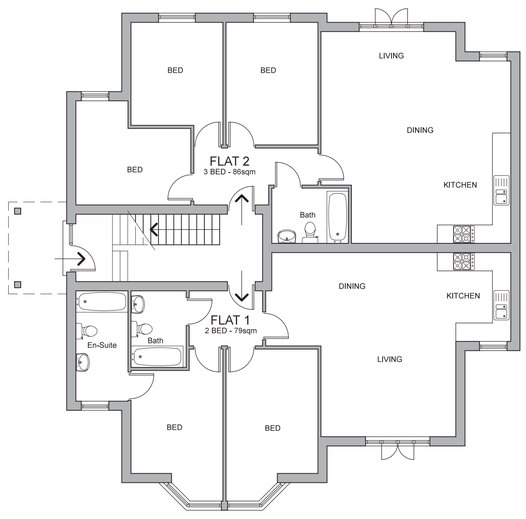
PROPOSED REAR ELEVATION 1:100



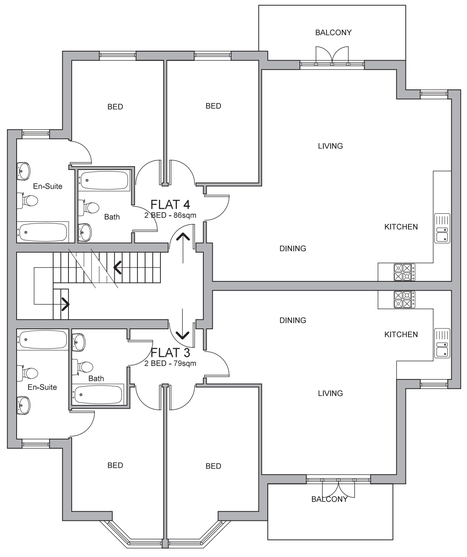
PROPOSED SIDE ELEVATION 1:100



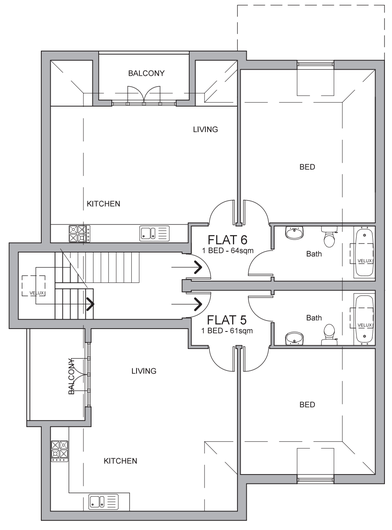
PROPOSED SIDE ELEVATION 1:100



PROPOSED GROUND FLOOR PLAN 1:100



PROPOSED FIRST FLOOR PLAN 1:100



PROPOSED SECOND FLOOR PLAN 1:100

Preliminary

Hillmandesign ltd
Architectural Practice

24 Crichton Road
Carshalton Beeches
Surrey, SM5 3LS
t:(020) 8715 5584
f:(020) 8715 8134
mail@hillmandesign.co.uk

PROJECT
THE OLD LIBRARY
150 LOWER MORDEN LANE,
MORDEN, SURREY, SM4 4SJ

DRAWING
PROPOSED PLANS & ELEVATIONS

SCALE 1:100
DATE JUN 15
DRAWING NO MRD/NB/101
REVISION

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